

hairs. Legs somewhat hairy, tarsi bearing two strongly curved claws. Rostrum extending to metathoracic segment.

*Adult*.—Length 4 mm., width 2.3 mm. This was described by Gibson as mentioned in the first part of this account. Gibson states in discussing *C. juglandis*, which is also found on walnut, that both *juglandis* and *parshleyi* occur in the type series of *juglandis* in the Fitch collection, and that this probably accounts for the more or less vague conception of *juglandis* Fitch. He states that *juglandis* is somewhat smaller than *parshleyi* and has the apical band straight across the elytra, while in *parshleyi*, the apical band runs obliquely from the costal margin toward the inner margin of elytra and is narrower. Gibson also states that *juglandis* Fitch occurs throughout New England and south and west to Kansas and Texas, its food plants including walnut, butternut and linden. This means that it undoubtedly occurs in New Jersey, but up to the present we have not been successful in locating any species other than *parshleyi* on walnut.

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## THE VARIETIES OF THE DRAGONFLY, *AGRION* *ÆQUABILE* (SAY).

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This living jewel with its metallic green body and crystal wings tipped with jet, flutters before the collector through the shadows of wooded streams from Maine to California, while its awkward nymph may be found crawling through the dense mats of willow and alder roots that hang in the woodland pools. Because of this timid and weak flight of *æquabile* as well as the rather special environment preferred by the nymphs, this species is seldom continuously spread in any region but is met on those occasional streams, which furnish its special requirements in patchy light, and root masses hanging in fairly clear water. As a result of this low ability to spread and the distance between broods because of the special environment required, this species has developed several marked varieties.\*

By reference to the plate the reader can see at once the dif-

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\*This same tendency to the development of varieties in the weak-flying Agrionine dragonflies is discussed by MacLachlan, "Notes on Odonata collected by Buckley in Ecuador," Trans. Ent. Soc. Lond., 1881, p. 25

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ference between these varieties, as all the figures are from the types except those for var. *æquabile*, which are from material in the Cornell collection and those of var. *yakima*, which are drawn from material collected by the writer in the type locality. All of these varieties undoubtedly intergrade because intergradations were found between var. *yakima* and var. *californicum*, and in a letter to Mr. Williamson, Dr. E. M. Walker states that such intergradations exist between var. *æquabile* and var. *hudsonicum*. The figures show that the five varieties can be grouped into two groups by the extent of colour on the male fore wing. Varieties *æquabile*, *coloradicum* and *hudsonicum* have the black of the front wing covering half the distance or less from the nodus to the tip. These are species of the eastern United States. Varieties *yakima* and *californicum* have the black of the front wings extending over more than half the space between the wing tip and the nodus. These are Pacific Coast forms.

Because of the plate, keys are unnecessary, and further notes are given under each variety heading.

***Agriion æquabile æquabile* (Say).**

Jour. Acad. Phila., 8, p. 33, 1839. (Calopteryx).

♂ and ♀ types in the Mus. Bost. Soc. Nat. Hist.

The writer has not seen these types so the authority for their location is Muttkowski's Catalogue. This is the widely distributed eastern form that ranges across the northern states from Maine to Iowa. Probably it will be found even farther west in the Missouri River Valley. It has the least colour in its wings of any of the varieties excepting possibly *coloradicum*. It is found in all collections.

***Agriion æquabile coloradicum* Cockerell.**

Psyche, 20, p. 173, 1913.

♂ type in the U. S. Nat. Mus.

The figures are drawn from the type. The female is unknown. This variety is from the high mountains of Colorado and differs from *æquabile* in having slightly more colour in the wings. It is the least distinct of the series of varieties. In the U. S. Nat. Mus. collection is a specimen from Ft. Collins, Colorado, identified by Dr. Banks as *hudsonicum*. I am inclined to call this *coloradicum*,

though it has more colour in the front wing than the type. Probably a good series would show that *coloradicum* and *hudsonicum* intergrade.

**Agrion æquabile hudsonicum** (Hagen).

Proc. Boston Soc. Nat. Hist., 18, p. 22, 1875.

♂ and ♀ types in the Mus. Comp. Zool., Cambridge, Mass.

The types plus the thorax and wings of a third specimen are all from Michipicoten, Lake Superior. These are the only specimens of this variety that the writer has found in United States collections. I think this has been taken recently by Dr. Walker. It is characterized by the combination of little colour in the front wing and much colour in the hind wing. As was stated at the beginning of the article, this is said by Dr. Walker to intergrade with var. *æquabile*.

**Agrion æquabile yakima** (Hagen).

Psyche, 5, p. 248, 1890.

♂ and ♀ types in the Mus. Comp. Zool., Cambridge, Mass.

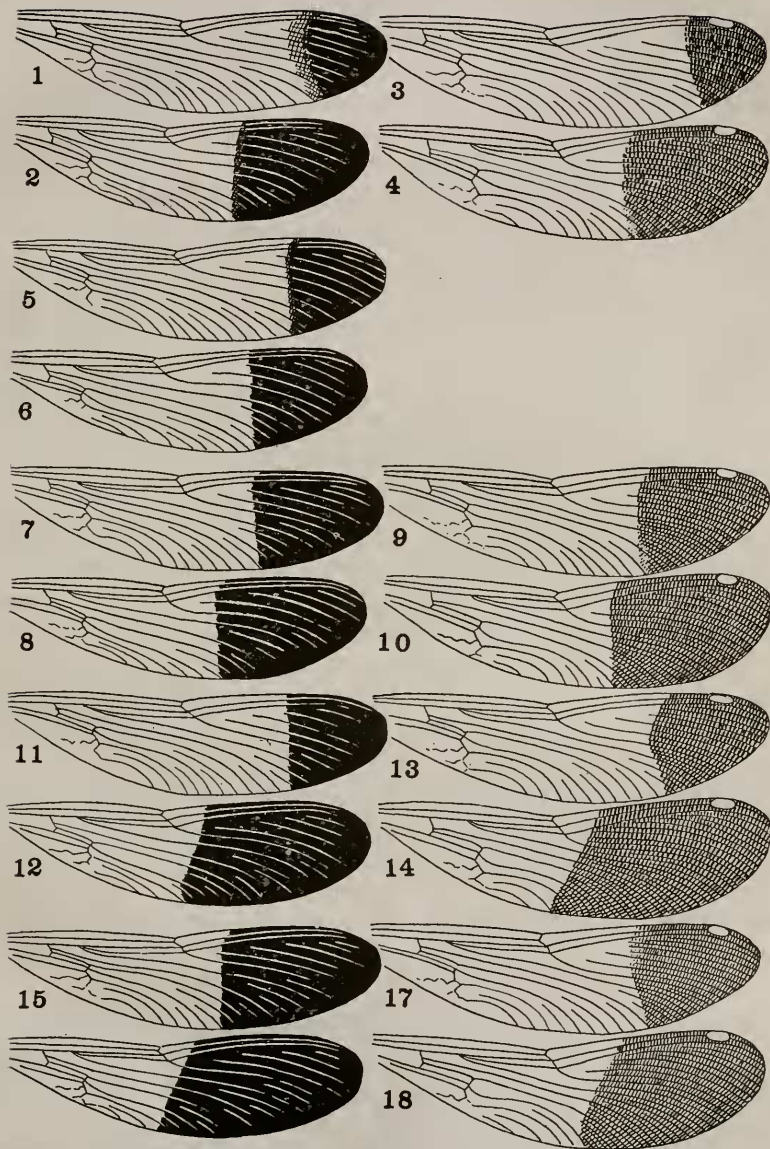
Dr. Banks kindly re-examined the types of this species for the writer and states that in the male the black in the front wing reaches barely more than half the distance from the tip to the nodus, and in the hind wing about two-thirds of the distance. While the types are from the Yakima River, (Wash.), this is the variety distributed through the Columbia River Valley. It has been recorded from Montana, (Elrod; Sci. Bull. Univ. Mont., p. 150-151, 1902), but the writer has seen none of the Montana specimens. A single male specimen is in the Cornell collection from Corvallis, Oregon. This is on the Willamette River, west of the main range of the Cascade Mountains, and, therefore, outside of the main Columbia River Valley, though the Willamette is a tributary of the Columbia. This variety intergrades with the next as is discussed in the succeeding section.

**Agrion æquabile californicum** Kennedy.

Proc. U. S. Nat. Mus., 52, p. 483-484, 1917.

♂ and ♀ types in the U. S. Nat. Mus., Washington, D. C.

This form has the most colour on its wings of any of the varieties of *æquabile*. The hind wing is as extensively coloured as in *hudsonicum*, and the front wing has the colour extending more than half way from the tip to the nodus. It is known from the



VARIETIES OF *AGRION ÆQUABILE* SAY.



types from the collection of Mr. and Mrs. Reynolds. The specimens were caught by Mr. Nunenmacher at Blue Lake, Humboldt Co., California. Other slightly less typical specimens are in Dr. Calvert's collection from Seattle, Washington. This variety is probably a member of the fauna of the narrow, very humid coast strip extending from northern California to southern Alaska. Various other species have dark forms in this humid belt. In the collection of the U. S. Biological Survey in Washington, D. C., are a male and a female *Agrion æquabile* collected on the Owyhee River, at Rome, Malheur Co., Oregon, which are intermediate between var. *yakima* and var. *californicum*. These are from southeastern Oregon. The writer had thought at first that the var. *californicum* might be a Pacific Coast extension of var. *hudsonicum*, but since the Malheur Co., Oregon, specimens have come to light it seems more closely related to var. *yakima*.

#### EXPLANATION OF PLATE XII.

- Figs. 1-4. *Agrion æquabile æquabile*, specimens in the Cornell collection from Orono, Maine. 1-2 male, 3-4 female.
- Figs. 5-6. *Agrion æquabile coloradicum*, male type in the U. S. National Museum. Female unknown.
- Figs. 7-10. *Agrion æquabile yakima*, specimens in the writer's collection from Satus Creek, Yakima Co., Washington. 7-8 male, 9-10 female.
- Figs. 11-14. *Agrion æquabile hudsonicum*, types in the Museum of Comparative Zoology, Cambridge, Mass., from Michipicoten, Lake Superior. 11-12 male, 13-14 female.
- Figs. 15-18. *Agrion æquabile californicum*, types in the U. S. National Museum from Humboldt Co., California. 15-16 male, 17-18 female.

#### NOTE ON AGRION ÆQUABILE HUDSONICUM (HAGEN).

Mr. Kennedy has asked me to add any remarks to his paper on *Agrion æquabile* that I might think desirable. I have only the following note to make concerning the race *hudsonicum*.

I have four much broken males of *A. æquabile* from the Kenogami River, Ont., on the Hudson Bay slope, north of Lake Superior, taken by Mr. W. J. Wilson in 1904. They were all taken within

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